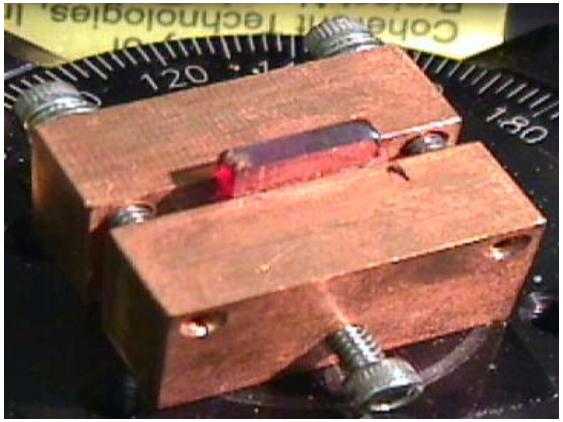
Bulk Crystal Growth of Optical Crystals

As-grown CdSSe crystal



Crystal mounted and ready for laser tests

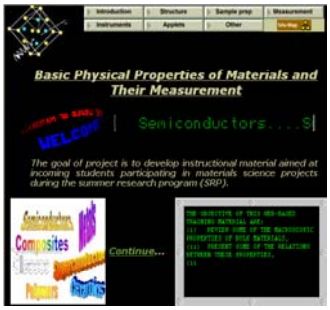
Graduate student performing optical measurements

Materials Science/Bulk Crystal Growth of Optical Crystals; A. Burger et al./Fisk U., DMR-0097272. Available infrared sources have limitations due to their cryogenic operation, narrow tunability, low output power and complexity. For a number of years Dr. Burger's research group was involved in the development of materials for room temperature, broadly tunable infrared lasers based on Cr2+ doped II-VI compounds. [IEEE Journal of Quantum Electronics, **Vol 33**, No. 4, (1997) 609-621]. The present study is an extension of previous efforts and will explore the benefits of using a ternary host material, CdSSe where some of the physical parameters can be tailored according to needs. In particular, tunable solid state mid-IR lasers based on Cr2+:CdSe, and its related ternary compounds, represent an opportunity for developing practical light sources for remote sensing, pollution monitoring, military and medical applications. Our close interactions with the U.S. industrial community and national labs will continue and accelerate the development of useful devices.

This research project addresses both research and educational issues, by training students in an area of materials science of high technological relevance, which will motivate students to pursue careers in the area of photonic materials. Fisk University is a Historically Black College and University (HBCU) committed to increasing the participation of underrepresented minorities in physical sciences. The program will augment our long-standing effort to recruit, train and mentor students from underrepresented groups.

" Crystal Growth and Energy Transfer in Cr2+:CdSe and CdSSe Systems "
Prof. Arnold Burger's research group at Fisk (DMR-0097272) conducts research in crystal growth and spectroscopy of important optical and electro-optical materials. In 2002 the group has produced two student presentations at the National Conference on Undergraduate Research (NCUR) and three papers were submitted and accepted for publication in a referred journal. In addition to these research achievements, the group provides a training of minority students in materials research. Supported by the NSF grant are: Damon Hillman Physics graduate student (received MA from Fisk, May 2002, accepted in the PhD program at Alabama A&MU), Timi Adetunji and Naima Jacobs-El, Physics Majors and at Fisk. Naima was partially supported by the NSF REU program. Fisk University is a Historically Black College and University and all three students are members of an underrepresented group in physical sciences.

Arnold Burger/Fisk U.; DMR-0097272



A website was developed at: http://www.fisk.edu/~aburger/published03_06/ The goal of project is to develop instructional material on basic physical properties of materials and physical characterization measurements and is aimed at incoming students participating in research in the project with partial support from the NSF sponsored summer program Research Experiences for Undergraduates (REU) at Fisk University. Last November Dr. Burger served as a panelist at the Third International Aviation Security Technology Symposium in Atlantic City, NJ, where he presented the research capabilities and recent achievements in the project. Last January, Dr. Burger was invited by the Director of the Optical & Quantum Computing Group of the Center for Engineering Science Advanced Research (CESAR) at ORNL to visit and deliver a seminar in the NSF/DMR research topic. Last May, we have been announced that he NSF Center for Biophotonics, Science and Technology (CBST) (with Fisk as one of the participating institutions) will be established at UC Davis. One of our components will be to train students in the area of materials research aimed at developing new infrared light sources for biomedical applications.